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THE FOREST SITUATION IN LUZERNE AND LACKAWANNA COUNTIES PENNSYLVANIA

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This is the sixth of a series of seven brief reports on the forest condition in the counties of the Anthracite Forest Region. This region includes 15 counties shown on the map on the back of this publication, which contain or surround the hard-coal deposits of Pennsylvania. Because of basic similarities, Luzerne and Lackawanna Counties are treated together. The purpose is to present tabular data from the Anthracite Forest Survey for local use, together with enough general information about the two counties to make the forest situation understandable. Forest areas and present condition of the forest were determined through interpretation of aerial photographs, and the distribution of the major forest types was ascertained largely by reconnaissance. Data on species, size-classes, volume, and growth applicable to the several forest types and condition classes were collected by detailed field surveys.

Acknowledgment is made to John A. Buttrick and Donald F. Robinson for aid in compiling and writing the report, and to Robert Bartlett for preparation of charts and maps.

FOREST SITUATION IN LUZERNE AND LACKAWANNA COUNTIES

PENNSYLVANIA

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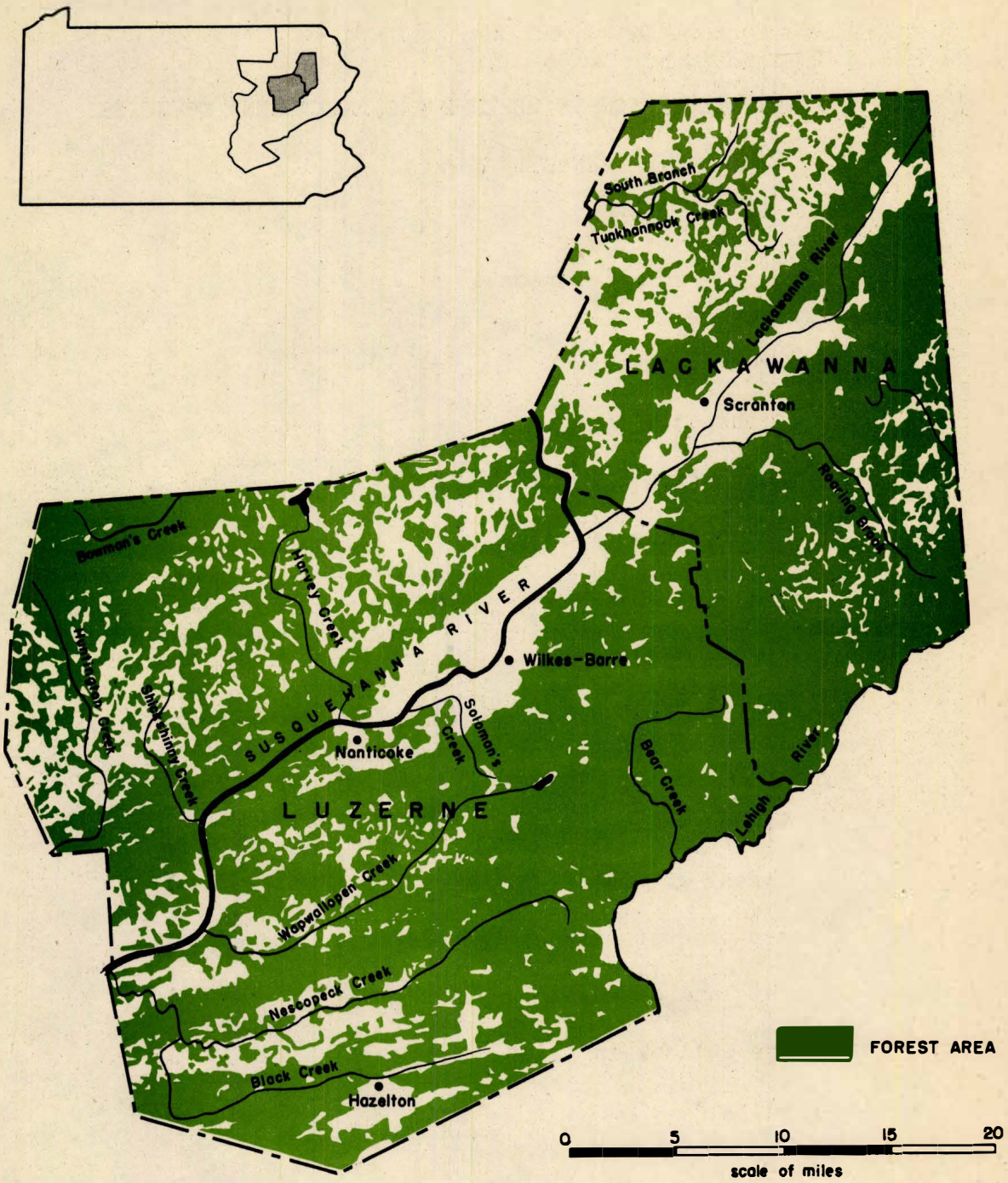

FIGURE 1.- FOREST AREA IN LUZERNE & LACKAWANNA COUNTIES OF PENNSYLVANIA

THE FOREST SITUATION IN LUZERNE AND LACKAWANNA COUNTIES

Luzerne and Lackawanna Counties are located at the very heart of the Anthracite Forest Region, and all the problems of the region confront these two counties in intensified form. Depleted forests, declining coal resources, a large population, the constant threat of unemployment - all combine to present the inhabitents with a difficult and potentially dangerous economic situation. It is no accident that concern for the condition of the forests of the region has been greatest in this area.

General Description

Most of Luzerne and Lackawanna Counties lie just south of the Allegheny Plateau, which forms a sort of rim around the northern and eastern portions of the two counties. South of it, chiefly in Luzerne, is a rolling foothill country, well-watered, with occasional low sharp ridges. Southeastern Luzerne is a relatively infertile, uneven tableland, where the upper extremity of the Appalachian chain joins the Allegheny Plateau on the east. Cutting down through Lackawanna County from the northeast and draining the bulk of that county is the Lackawanna River, which joins the Susquehanna just across the Luzerne County line. Most of Luzerne County is drained by the Susquehanna and streams flowing into it. The eastermost parts of both counties are drained eastward (into the Delaware) by the Lehigh and its tributaries. The total area of the two counties is about 1360 square miles, or 870,500 acres.

Transportation

Because of the presence of the anthracite industry, transportation in these two counties is excellent. The Scranton - Wilkes-Barre area is served by criss-crossing through lines and branches of the Lehigh Valley; the Pennsylvania; the Delaware, Lackawanna, and Western; the Delaware and Hudson; the Erie; the Lackawanna and Wyoming Valley; and the New York, Ontario, and Western railroads. There is railroad service out of the area in all directions. Freight service is especially good, but there is fair passenger service also. There are 1069 miles of improved State highway and over 1500 miles of rural roads. Bus lines fan out from the metropolitan areas, and there is a commercial airport at Forty Fort.

Population

Mining areas are characterized by congested settlements. Most of the large population of Luzerne and Lackawanna Counties occupies a very small area in the neighborhood of the coal fields. Beyond the coal fields, especially to the west, is some farming country and a small scattered rural population. In 1940 there were 742,761 persons living

in the two counties, of whom only 21,249, or less than 3 percent, were living on farms. At that time Scranton had a population of 104,404; Wilkes-Barre, 86,236; Hazleton, 38,009; and there were eight other cities and boroughs with more than 10,000 inhabitants each. During the past fifteen years the population in this area has been declining. Between 1930 and 1940 it fell by some 13,000 and in 1942 the civilian population was estimated at as little as 664,000.

Occupations

Over 60 percent of the anthracite produced in Pennsylvania is mined in Luzerne and Lackawanna Counties. The Lackawanna Valley, the Wyoming Valley, and the Hazleton Plateau are all underlain with coal; and though only 28 percent of the employment of these counties is directly provided by the coal fields themselves, the economy is colored and determined by the anthracite industry. When it was booming during the first World War, the region was prosperous. As anthracite production fell off during the 1920's and yet more in the 1930's, this section began to decline.

The coal deposits of the Wyoming Valley have long been known. Indeed the controversy of the eighteenth century between the Colony of Pennsylvania and the Colony of Connecticut for control of this area may in part have been due to the desire of both to control this resource. In any case, the deed by which the Six Nations conveyed the territory to the Susquehanna Company, July 11, 1754, makes no mention of the timberland and streams, as other Indian deeds of the period do, but does specifically mention "all and every the mines minerals or ore of what kind soever standing growing being found or to be found upon any part or parcel thereof" 1/. And at a meeting of the company held in Windham, Connecticut, April 17, 1763, it was voted to reserve for company use and disposal "all beds of mine ore and coal." It was not until after the War of 1812, however, that the commercial development of coal was begun.

For a hundred years thereafter coal production increased steadily, reaching its peak in 1917. Since then the output has been declining. The demand for anthracite has slackened as a result of the development of other sources of heat and power; the mines are becoming depleted; and the cost of production has increased. The end of the anthracite industry in these two counties is already in sight. In the Hazleton area the mines will not last more than another ten years at the present rate of production; and even in the northern field the life of the mines is set at fifty years 2/. In 1940, 32 million tons of coal were mined; in 1942, as a result of wartime demands, this output was increased to 35 million 3/. On the other hand, the number employed dropped from 60,000 to 54,000 during the same period, and the increase of output has to some extent cut down the life-expectancy of the mines. Furthermore, the engineering problems of handling mine water and of excavating the remaining

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1/ J. P. Boyd, Susquehanna Company Papers, Wilkes-Barre 1930

2/ Report of the Anthracite Coal Industry Commission, Harrisburg, 1938

3/ Pennsylvania Department of Mines

coal are piling up to the point where mining in this region will have difficulty in paying its way.

Next in importance to mining are the manufacturing industries. But unless they can be greatly expanded, these cannot possibly take up the slack in employment resulting from the decline in mining. In 1940 about 34,000 persons were employed in manufacture. Of these, more than half were employed in the textile industries, which are often but supplementary means of livelihood for the families of miners. The comparative lightness of the work and the relatively low market value of the products lead to the employment of a high percentage of women; and the textile industries could hardly serve as a major source of income for the area. The other industries of the region are relatively small. The largest of them, the food manufacturing industry, was employing only 5000 persons in 1940, and the metal manufacturing industries but 4000. This last industry has increased somewhat since the beginning of the war; but the increase in employment in metal manufacturing between 1940 and 1942 was less than the employment decrease during the same period in mining 4/.

OCCUPATIONS OF POPULATION: 5/

Total population		742,761	
Not in labor force		449,052	60%
In labor force		293,709	40%
Unemployed		92,593	32%
Employed		201,116	68%
Trade and service		86,793	43%
Coal mining		56,833	28%
Manufacturing			
Metal	4,190)		
Textile	18,100)		
Food	5,085)	33,914	17%
Other	6,539)		
Transportation		11,734	6%
Construction		6,293	3%
Agriculture		4,353	2%
Forest products industries			
Forestry	71)		
Logging	203)		
Milling	184)	1,007	1%
Wood manufacture	372)		
Paper manufacture	177)		
Quarrying and other mining		129	*

* negligible

4/ Tenth Industrial Directory of the Commonwealth of Penna., Dept. of Internal Affairs; compiled by Bureau of Statistics, Harrisburg 1941.

5/ This table, based on the U. S. Census for 1940, indicates the primary occupations of the residents of Luzerne and Lackawanna Counties.

In 1940, 43 percent of those employed were engaged in trade and service occupations, 6 percent in transportation, and 3 percent in construction -- more than half the total. But these occupations depend for their existence on others, for even construction is rather a service than a productive industry. So, far from being able to provide more jobs if other employment falls off, the work provided by these occupations will inevitably tend to fall off in much the same proportion.

The first settlers of the Wyoming Valley were farmers, and there is still farming in the region; but only 2 percent of the working population is so engaged. In 1940, 115,000 acres, or about 13 percent of the total area, was in cropland, some of it of above average fertility. There are 3896 farms, nearly two-thirds of them in Luzerne County. Slightly more than a tenth of them are operated by tenants. The most important agricultural activity in Lackawanna County is dairying; in Luzerne crop-farming and apple-growing predominate. The annual farm income averages about $1450 per farm (1939).

Forest Description

During the nineteenth century the virgin forest of oaks, maple, ash, white pine, and hemlock was removed from large areas by the settlers in clearing for farmland. In the latter part of the century and in the early 1900's the remaining forests were cut by lumbermen. White pine for lumber and hemlock for tanning bark were taken first. Later the large hardwoods were cut. Most of the virgin timber was gone by the time of the first World War. Since then the second and even the third growth in places has been clear-cut for mine timbers. In the neighborhood of the coal mines and to the east of them these clear-cut areas have been burned over, some of them many times. But in the past thirty years the work of the State Department of Forests and Waters has greatly reduced the damage caused by fire.

Forest area

Great sections of Luzerne and Lackawanna Counties are uninhabited forest land (fig. 1) 6/. Forests cover 587,400 acres, two-thirds of the entire area. On either side of the Lackawanna and Wyoming valleys and in the northwest corner of Luzerne County are extensive tracts. Elsewhere are smaller forest areas, many of them farm woodlands. There are comparatively few

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The figures given in the text, on the other hand, are based on the employment provided by industries located within these counties. Discrepancies are due to the fact that many people live in one area and work in another.

6/ Maps showing the location of all forest tracts are available in a scale of 1" = 1 mile for each county; a similar map showing forest condition is also available for Lackawanna. These maps may be ordered through the Northeastern Forest Experiment Station, 614 Bankers Securities Building, Philadelphia 7, Pennsylvania. A postal or express money order, draft, or check made out to the Treasurer of the United States, covering the full amount, should accompany the order. Prints will be forwarded from the Forest Service, Division of Engineering in Washington, D. C. Each map will cost: Luzerne County $ .44, Lackawanna County $ .40.

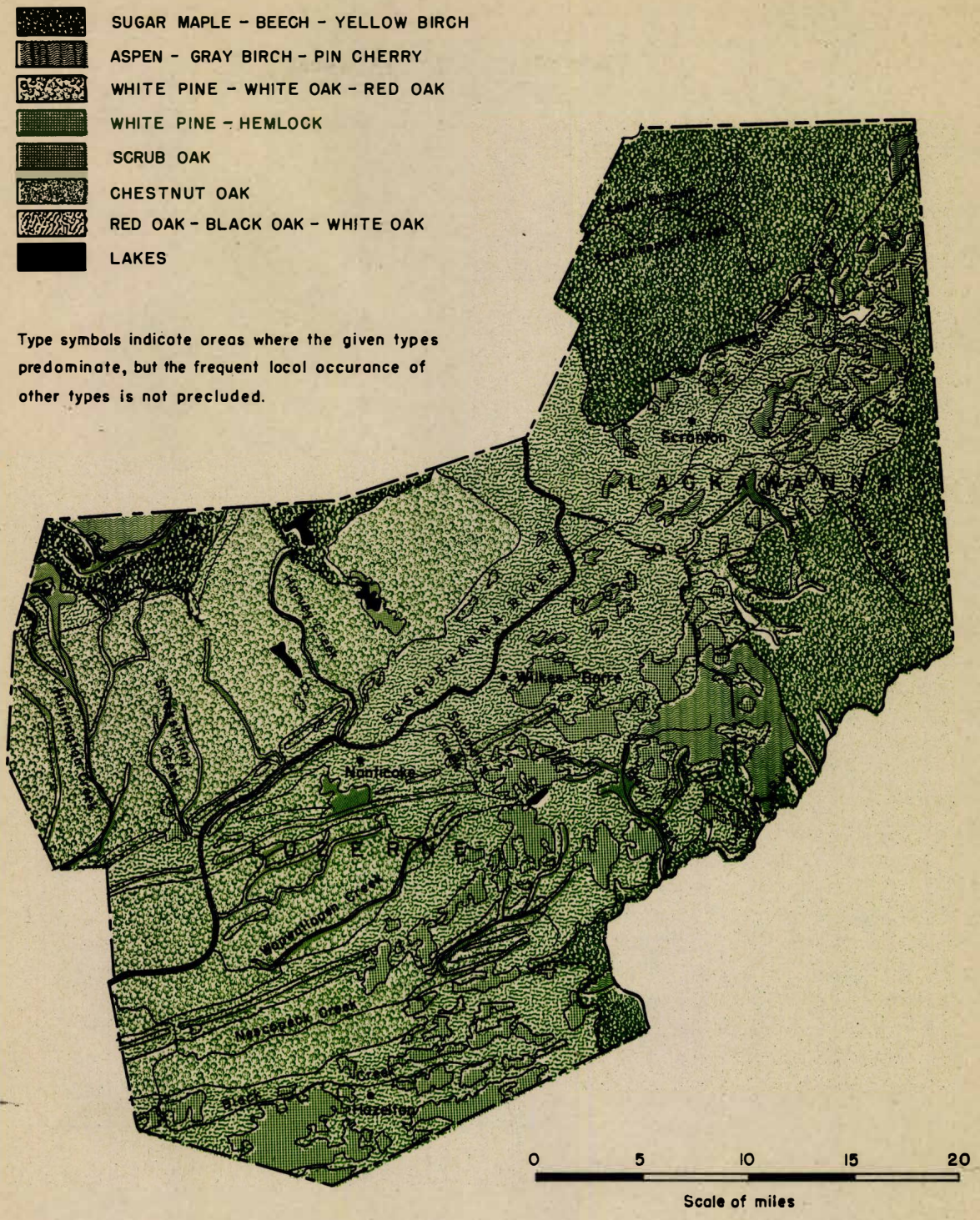
SUGAR MAPLE - BEECH - YELLOW BIRCH
ASPEN - GRAY BIRCH - PIN CHERRY
WHITE PINE - WHITE OAK - RED OAK
WHITE PINE - HEMLOCK
SCRUB OAK
CHESTNUT OAK
RED OAK - BLACK OAK - WHITE OAK
LAKES
Type symbols indicate areas where the given types predominate, but the frequent local occurance of other types is not precluded.
Scranton
Wilkes-Barre
Nanticoke
Hazleton
0 5 10 15 20
Scale of miles

FIGURE 2.– AREAS CHARACTERIZED BY THE MAJOR FOREST TYPES IN LUZERNE AND LACKAWANNA COUNTIES

few really small areas. About 90 percent of the total is in tracts of 50 acres or larger 7/.

	LUZERNE		LACKAWANNA	
	Acres	Percent	Acres	Percent
Forest land	395,000	68	192,400	66
Nonforest	182,100	32	101,000	34
Gross area	577,100	100	293,400	100

Forest types

Forest type variations in the two counties are quite complex (fig. 2). In northern and southeastern Lackawanna and in two small patches, one in the northwest and one in the southeast, in Luzerne, the sugar maple - beech - yellow birch type is to be found. To either side of the Susquehanna and Lackawanna Rivers and through the greater part of the highlands in southern and eastern Luzerne is the red oak - black oak - white oak type. The white pine - white oak - red oak type covers the greater part of the area in northern and western Luzerne. Several patches of aspen-gray birch - pin cherry occur where fire has destroyed reproduction in the sugar maple - beech - yellow birch type, the largest area being partly in Luzerne and partly in Lackawanna to the east of Wilkes-Barre. Patches of scrub oak are to be found through most of the oak area, especially east and south of the Susquehanna and Lackawanna Rivers. Chestnut oak dominates the ridges, and there are white pine - hemlock stands along some of the streams and lakes, mostly in Luzerne.

Forest condition

Next to coal, the forests are the most important natural resources of these two counties. At present, however, they are in poor condition (fig. 3) 8/. There is some saw timber (approximately 27,000 acres) and about 97,000 acres is in merchantable pole timber. The rest of the forest, nearly 80 percent of the total forest area, averages less than 230 cubic feet to the acre. This condition is due largely to the almost universal practice of clear-cutting immature stands for mine timbers and to the prevalence and destructiveness of fires through much of the area. But forests, unlike coal, are renewable; and as the coal is used up, they may come to play an increasingly important part in the economy

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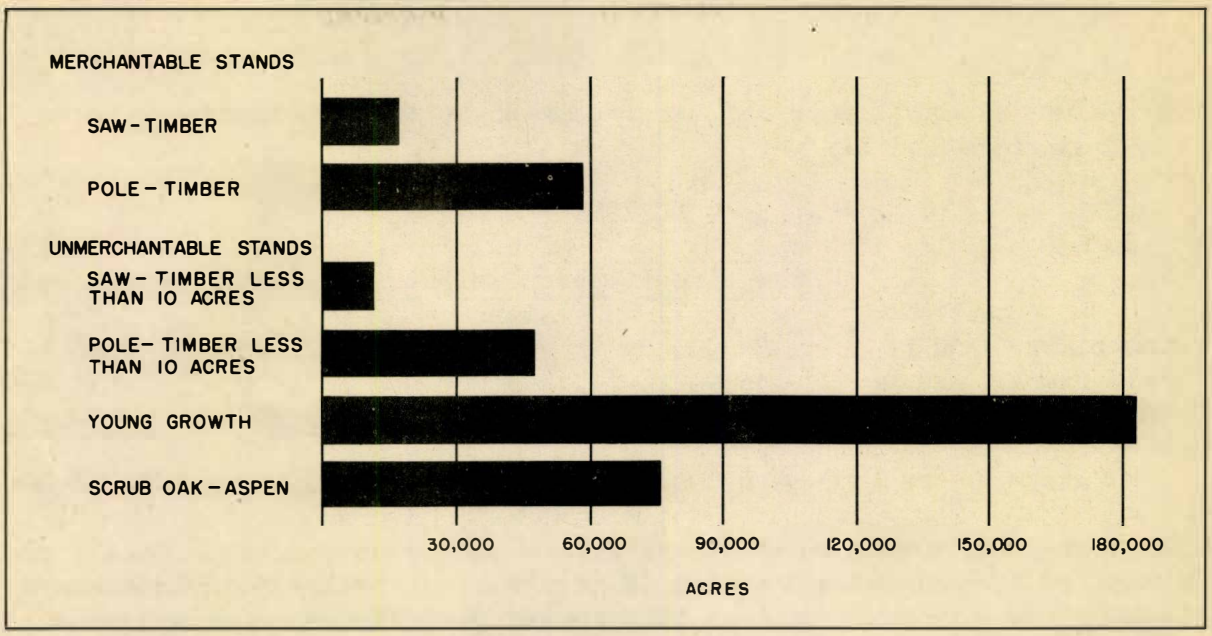
7/ For detailed tables on each county see Appendix. Differences between the figures given in this report and those in Anthracite Survey Paper No. 5 on the forests of Luzerne County are due to a reappraisal of the forest resource made with the aid of aerial photographs and to differences in definition, especially of merchantable stands.

8/ The condition classes recognized are: 1. Saw-timber stands: stands of 10 acres or larger, each of which contains at least 2000 board feet of saw-timber. 2. Pole-timber stands: stands of 10 acres or larger, each acre of which contains a minimum timber volume of approximately

LUZERNE COUNTY



LACKAWANNA COUNTY

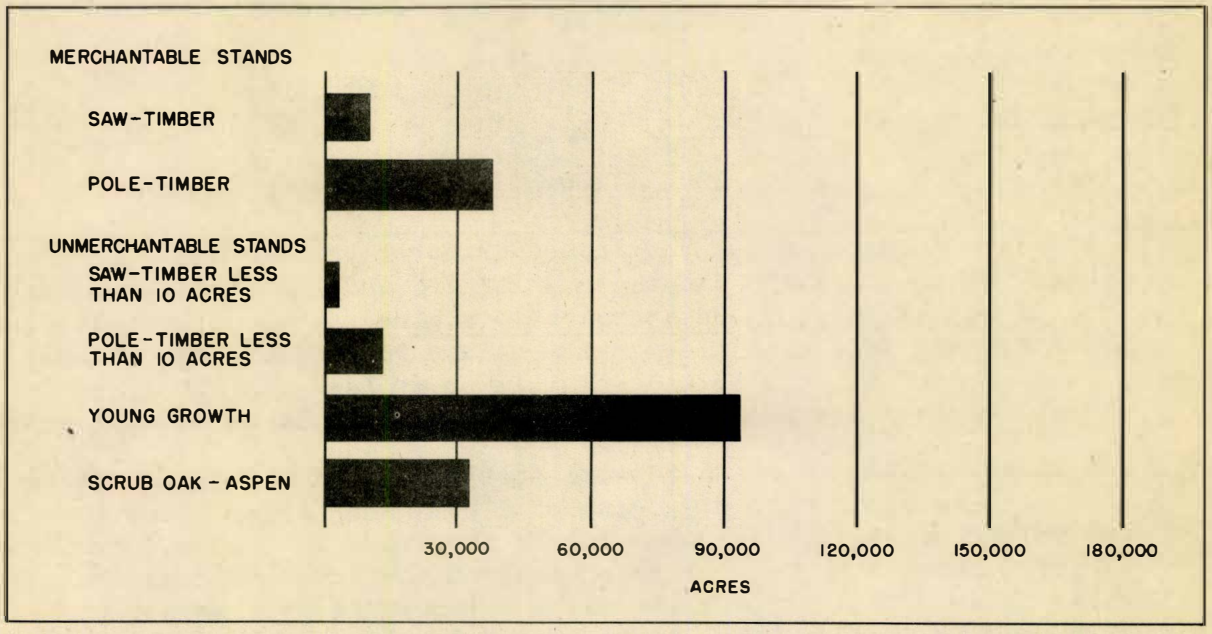


Figure 3.- THE CONDITION OF THE FOREST

of Luzerne and Lackawanna Counties. In southern Luzerne is considerable scrub oak, much of it on such poor site as to make it improbable that really good commercial timber will ever be grown there. But through the two counties as a whole the unmerchantable areas are in young growth of high quality species and are rapidly approaching the pole-timber condition.

Timber volume

The volume of saw timber and the green weight of all timber are shown in the following table: 9/

	LUZERNE		LACKAWANNA	
	Saw timber	Total green weight	Saw timber	Total green weight
	M bd.ft.	Tons	M bd.ft.	Tons
Saw-timber stands	88,900	756,500	42,600	394,500
Pole-timber stands	33,900	1,103,000	21,700	714,000
Unmerchantable stands	93,200	2,149,800	29,900	660,100
Total	216,000	4,009,300	94,200	1,768,600

The distribution of the cubic-foot volume in the merchantable pole-timber stands by tree size may be seen in figure 4. Especially in Lackawanna County, the hardwoods make up the greater part of the green weight of all timber. In Luzerne this is mostly in oaks; in Lackawanna, in the other hardwoods.

	LUZERNE		LACKAWANNA	
	Tons	Percent	Tons	Percent
Conifers	152,600	14	53,400	7
Oaks, hickory, sugar maple	670,600	61	253,400	36
Other hardwoods	279,800	25	407,200	57
Total	1,103,100	100	714,000	100

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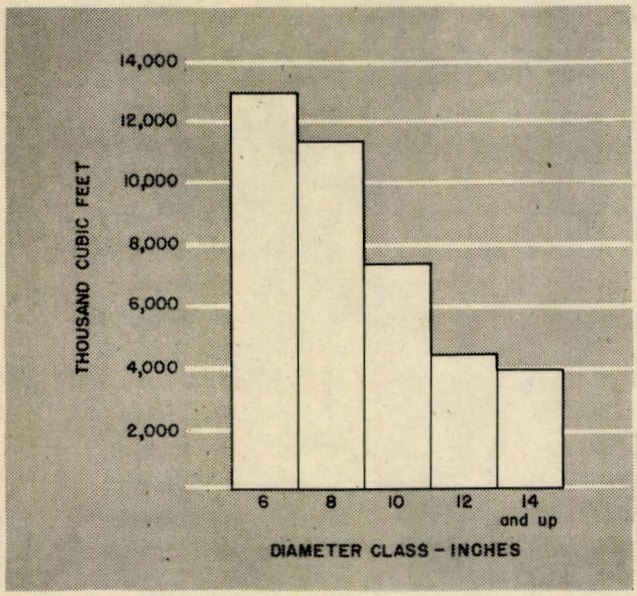
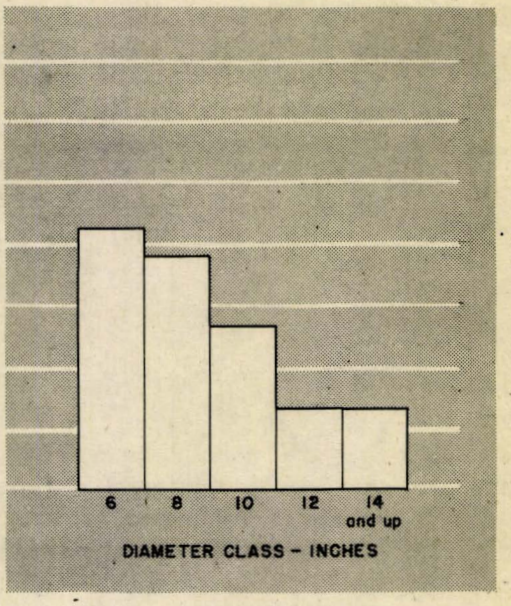
5 standard cords in trees 5.0 inches diameter breast high (hereafter denoted by the initials d.b.h.) and larger, and less than 2000 board feet of saw timber. 3. Unmerchantable stands: areas of forest land which contain less than the minimum volume for pole-timber stands, plus stands of saw timber and pole timber of less than 10 acres in extent, whether isolated tracts or stands within larger forest areas.

9/ Saw-timber volume is the net board foot volume of timber of sawlog-size material in conifers 9.0 inches d.b.h. and larger, plus the net volume of sawlog-size material in hardwoods 11 inches d.b.h. and larger. Board foot volumes were based on the International 1/4" log rule, which closely approximates green lumber tally. Deductions were made for cull. Total green weight is the weight of all trees 5.0 inches and larger, including bark and the tops and limbs to a 4-inch diameter. This was computed in cubic feet and converted to tons (green weight) by the application of cubic foot-per-ton factors, varying by species groups and averaging about 35 cubic feet per ton.

Figure 4. - CUBIC FOOT VOLUME IN MERCHANTABLE POLE-TIMBER STANDS BY DIAMETER CLASSES - ALL SPECIES.



LUZERNE COUNTY

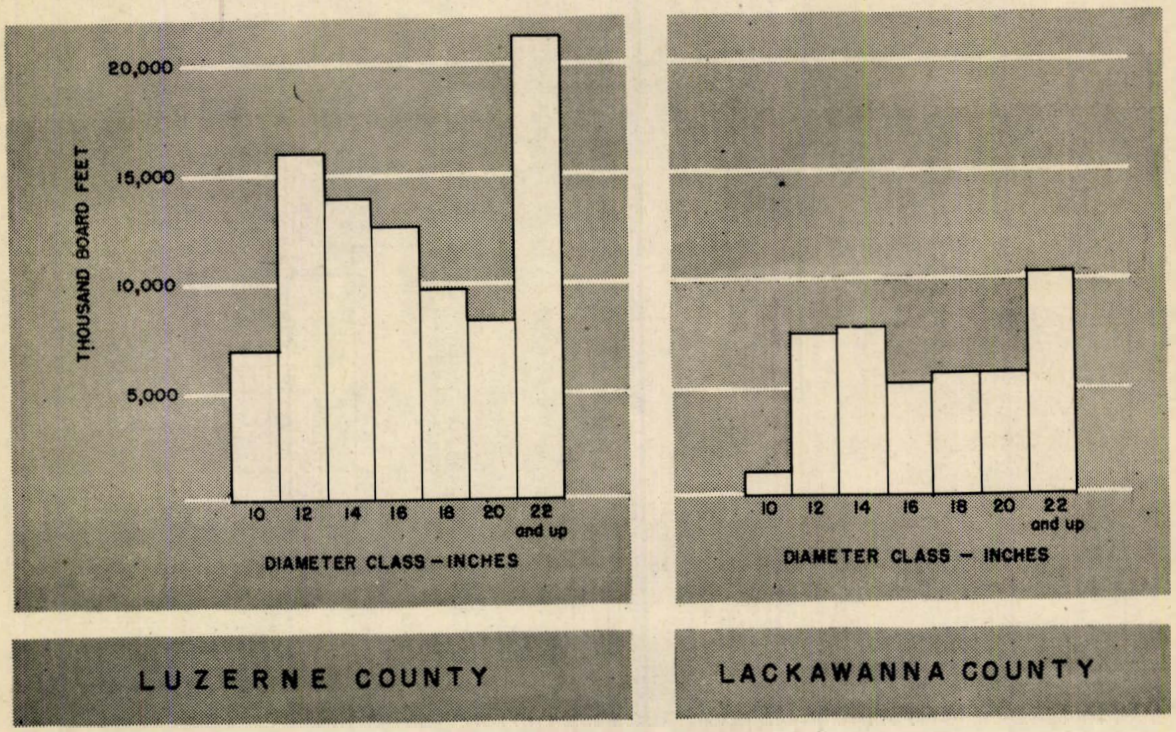


LACKAWANNA COUNTY

The merchantable saw-timber stands are largely in young growth. Less than 14 percent of the area bears as much as 8000 board feet to the acre and over 45 percent has less than 4000 to the acre:

Thousand Board Feet per Acre	LUZERNE		LACKAWANNA	
	Acres	M bd. ft.	Acres	M bd. ft.
8 and more	2,700	29,700	1,100	10,200
6 to 8	2,400	15,800	1,300	7,900
4 to 6	4,100	19,700	2,900	12,600
2 to 4	7,900	23,700	4,800	11,900
Total	17,100	88,900	10,100	42,600

Figure 5. – BOARD FOOT VOLUME IN MERCHANTABLE SAW-TIMBER STANDS BY DIAMETER CLASSES – ALL SPECIES



LUZERNE COUNTY

LACKAWANNA COUNTY

The species distribution is quite different in the saw-timber stands from that in the pole-timber stands. In Luzerne well over half the saw timber in the saw-timber stands is in conifers, and in Lackawanna more than a quarter. The reason is that such virgin stands as have survived in the two counties, for example in the neighborhood of Bear Creek or in Kitchen Creek, are largely in conifers:

	LUZERNE		LACKAWANNA	
	M bd.ft.	Percent	M bd.ft.	Percent
Conifers	52,400	60	10,900	26
Oaks, hickory, sugar maple	21,300	24	10,800	25
Other hardwoods	15,200	17	20,900	49
Total	88,900	100	42,600	100

The distribution of this volume in saw-timber stands by tree size may be seen in figure 5.

Current forest growth

The following table shows the total timber growth and the saw-timber growth of the different condition classes in the two counties:

1943

Total timber growth

	LUZERNE	LACKAWANNA
	M cu.ft.	M cu.ft.
Saw-timber stands	1,019	584
Pole-timber stands	2,319	1,635
Unmerchantable stands	6,505	1,883
Total timber growth	9,843	4,102

Saw-timber growth

	M bd.ft.	M bd.ft.
Saw-timber stands	3,860	1,940
Pole-timber stands	2,570	1,810
Unmerchantable stands	6,110	2,070
Total saw-timber growth	12,540	5,820

Forest Products Industries

Only one percent of the population of these two counties is employed primarily in forest and forest products industries. Over half of these are engaged in wood and paper manufactures, most of which import their raw materials from elsewhere. According to the Census of 1940 only 458 persons were engaged in work that was wholly and directly dependent on the forests of Luzerne and Lackawanna Counties: 71, in forestry; 203, in logging; and 184, in milling. In addition to these, however, must be counted many individuals, chiefly farmers, who are employed part time in logging or milling.

In 1942 there were 31 active sawmills, most of them in Luzerne County and nearly all of them small. About 9 million board feet of lumber was produced, 26 percent of it from coniferous species. The number of these mills by production classes is shown in the following table:

Production class	LUZERNE	LACKAWANNA
Thousand board feet	Number of Mills	
Idle	8	0
1 to 50	10	2
50 to 500	10	2
500 to 1000	3	2
Over 1000	2	0
Total	33	6

The most important timber operation in these counties is mine timber production. The methods used vary widely. A few operators cut only large props and practice a form of selective cutting. Others combine mine timber

production with lumber production. Yet others cut everything that is saleable, including small material for lagging.

Forest Land Ownership

About 90 percent of the forest land in Luzerne and Lackawanna Counties is privately owned. Nearly 20 percent of the total belongs to coal companies; 9 percent, to water companies; 12 percent, to farmers; and 49 percent, to other private owners. Of the publicly-owned land the State Game Commission administers more than half, most of it in eastern Luzerne and the adjoining parts of southern Lackawanna. The counties, especially Luzerne, have also been acquiring forest land. Except for one small community-owned plot in Lackawanna County, the rest of the public forest land is under the supervision of the State Department of Forests and Waters. The ownership distribution of the forest land in the two counties is as follows:

Public ownership	LUZERNE Acres	LACKAWANNA Acres
State (Department of Forests and Waters)	1,100	5,300
State Game Commission	27,900	4,300
County	15,000	5,200
Community	--	100
Total public ownership	44,000	14,900
Private ownership		
Coal companies	76,300	41,100
Water companies	23,400	30,800
Farmers	47,300	23,500
Others	204,000	82,100
Total private ownership	351,000	177,500

Future Outlook in Brief

Much of the forest in Luzerne and Lackawanna Counties is potentially productive. In Lackawanna over half the forest land is in the sugar maple - beech - yellow birch type, which grows fast and produces valuable timber if properly managed. In Luzerne are many acres of the white pine - white oak type, which also produces valuable timber with proper care. Most of these forest areas are well stocked with thrifty young growth and, if they can escape clear cutting before maturity, will bear a valuable crop of timber trees. Even some of the scrub oak areas to the east of Wilkes-Barre and in northern Lackawanna are of good site and will convert to stands of commercial species if protected from fire and insects.

The principal forest needs of the two counties are:

1. Protection from fire. Fire has been a devastating scourge in eastern Luzerne and Lackawanna. And though control measures under the supervision of the State Department of Forests and Waters have greatly reduced the extent and destructiveness of fires in this area, fire still remains the principal enemy of these forests.

2. Protection from insects. A small epidemic of the gypsy moth has occurred in southern Lackawanna and contiguous parts of Luzerne. This area has been quarantined by Federal and State agencies and the insect is under control. Steps are being taken which may lead to the eradication of this insect.

3. Timber-stand improvement. The present practice of clear-cutting immature stands for mine timbers should be stopped. Low quality material can be produced by thinnings and weedings which will improve the stands while providing for the needs of the mines. The coal resources in this area are fast being consumed, and it behooves forest owners to start converting their woodlands to the production of lumber for construction and manufacture.

4. Planting. Spot-planting may be used to hasten the rehabilitation of stands now stocked with inferior or non-commercial species. In many areas planting for watershed protection will aid in reducing flood levels, will help preserve the water supply, and will go far towards eliminating erosion. Waste areas near towns might also be planted as school or community forests. Planting of mine waste banks and strippings to prevent the blowing of dust and the silting of streams should also receive consideration.

5. Increase of public ownership. Many acres of forest land, especially in the neighborhood of the mines, are in so depleted a condition that they cannot be managed profitably under private ownership. These might best be acquired by public agencies, municipal, county, or State, for game production for the provision of recreational facilities, for watershed protection, and for timber production.

6. Expansion of educational activities. General public knowledge of the dangers and disastrous results of fire, and of the monetary returns to be gained from good forest management is essential if any program of forest improvement is to succeed.

Since the establishment of the Industrial Forestry Division in the Wyoming Valley Chamber of Commerce, there has been an active program for forest improvement in Luzerne County. Already this agency has accomplished a great deal. It has collaborated with the State Department of Forests and Waters in its fire control program and has been instrumental in developing local fire organizations to supplement the work of the State. It has collaborated with the State and Federal governments in supporting a farm forester (recently a second farm forester has been employed on a part-time basis) who works not only in Luzerne but in

Lackawanna and Wyoming Counties also. It has assisted in the establishment of county forests and encouraged and aided the planting of school memorial forests by school children. It has studied the problems entailed in the planting of mine waste banks and in the reduction of flood levels.

Continuation and expansion of this work in Luzerne and an extension of it into Lackawanna County will convert the present relatively poor and unprofitable forests of this area to valuable and productive stands, which could serve as a source of jobs and income to hundreds of individuals. Since there is every likelihood that jobs will be greatly needed in these counties in the next few years, this is an objective that should win the support of all residents of the two counties.

APPENDIX

Tables 1 to 9 - Luzerne County

Tables 1 to 9 - Lackawanna County

LUZERNE COUNTY

Table 1.- Land use

Land use	Area acres	Proportion of class percent	Proportion of gross area percent
Forest 1/			
Tracts less than 10 acres	6,800	1.7	1.2
Tracts 10 up to 50 acres	34,900	8.8	6.0
Tracts 50 acres and over	353,300	89.5	61.2
All forest land	395,000	100.0	68.4
Nonforest			
Cropland 2/	75,600	41.5	13.1
Mine waste 1/	18,500	10.2	3.2
Water 2/	7,700	4.2	1.3
Other	80,300	44.1	14.0
All nonforest land	182,100	100.0	31.6
Gross county area	577,100	--	100.0

1/ Based on aerial photographs taken in 1938 - 1939.

2/ Bureau of the Census, 1940.

Table 2.--Forest area by minor civil divisions

Civil division 1/	Gross area	Nonforest area	Forest area	Proportion gross area in forest	Proportion of county forest land
	Acres	Acres	Acres	Percent	Percent
Bear Creek t.	39,500	900	38,600	97.8	9.8
Black Creek t.	15,500	4,500	11,000	71.2	2.8
Buck t.	11,800	300	11,500	97.9	2.9
Butler t.	21,600	6,800	14,800	68.5	3.8
Conyngham t.	10,900	2,800	8,100	74.0	2.0
Dallas t., Dallas b.	13,800	8,400	5,400	38.8	1.4
Denison t.	23,700	1,400	22,300	94.0	5.7
Dorrance t.	17,100	4,900	12,200	71.3	3.1
Duryea b.	3,600	1,900	1,700	47.6	0.4
Exeter t., Exeter b.	11,500	5,200	6,300	54.7	1.6
Fairmount t.	28,700	8,200	20,500	71.6	5.2
Fairview t.	6,800	400	6,400	94.5	1.6
Foster t., Jeddo b., Freeland b., White Haven b.	30,100	5,400	24,700	82.1	6.3
Franklin t.	8,300	5,100	3,200	38.7	0.8
Hanover t., Sugar Notch b., Warrior Run b., Ashley b., Nanticoke c.	16,300	7,400	8,900	54.9	2.2
Hazel t., Hazleton c., West Hazleton b.	32,800	6,500	26,300	80.2	6.7
Hollenback t.	9,900	5,500	4,400	44.5	1.1
Hunlock t.	13,400	3,500	9,900	74.0	2.5
Huntington t., New Columbus b.	20,400	13,000	7,400	36.2	1.9
Jackson t.	8,200	3,300	4,900	59.6	1.2
Jenkins t., Yatesville b., Laflin b.	10,600	1,600	9,000	85.2	2.3
Kingston t., Kingston b., Larksville b., Courtdale b., Pringle b., Forty Fort b., Wyoming b., Swoyerville b., Luzerne b., Edwardsville b., W. Wyoming b.	21,100	13,200	7,900	37.3	2.0
Lake t.	20,100	5,300	14,800	73.5	3.8
Laurel Run b.	4,300	300	4,000	93.8	1.0
Lehman t.	15,700	6,800	8,900	56.6	2.2
Nescopeck t., Nescopeck b.	12,800	7,800	5,000	38.9	1.3
Newport t.	9,900	2,800	7,100	71.7	1.8
Pittston t., Pittston c., West Pittston b., Hughestown b., Dupont b., Avoca b.	12,400	4,300	8,100	65.0	2.0
Plains t.	10,500	3,000	7,500	71.2	1.9

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Table 2.--Forest area by minor civil division

Civil division 1/	Gross area	Nonforest area	Forest area	Proportion gross area in forest	Proportion of county forest land
	Acres	Acres	Acres	Percent	Percent
Plymouth t., Plymouth b.	11,500	3,900	7,600	66.0	1.9
Rice t., Nuangola b.	7,000	700	6,300	89.6	1.6
Ross t.	28,100	6,600	21,500	76.6	5.5
Salem t.	19,200	8,100	11,100	57.8	2.8
Slocum t.	6,600	1,500	5,100	76.6	1.3
Sugar Loaf t., Conyngham b.	13,900	6,700	7,200	51.8	1.8
Union t., Shickshinny b.	13,400	6,200	7,200	53.8	1.8
Wilkes-Barre t., Wilkes-Barre c.	6,400	6,200	200	3.7	*
Wright t.	9,700	1,700	8,000	82.3	2.0
All civil divisions	577,100	182,100	395,000	68.4	100.0

1/ Abbreviations: t. - township, b. - borough, c. - city.

* Negligible.

Table 3.--Forest area by forest types and conditions

Forest type	Saw-timber stands		Pole-timber stands		Unmerchantable stands		All stands	
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
Northern hardwoods	3,000	17.5	8,900	15.1	15,500	4.9	27,400	6.9
Aspen - gray birch - pin cherry	--	--	200	0.3	13,000	4.1	13,200	3.3
White pine - hemlock	4,600	26.9	5,300	9.0	13,400	4.2	23,300	5.9
White pine - white oak - red oak	4,100	24.0	22,800	38.6	84,000	26.3	110,900	28.1
White oak - red oak - black oak	5,200	30.4	20,100	34.0	119,400	37.5	144,700	36.7
Chestnut oak	200	1.2	1,800	3.0	10,300	3.2	12,300	3.1
Scrub oak	--	--	--	--	63,200	19.8	63,200	16.0
All types	17,100	100.0	59,100	100.0	318,800	100.0	395,000	100.0

Table 4.--Volume by Forest Types

Forest type	Saw-log volume M bd.ft.	Total volume M cu.ft.
Sugar maple - beech - yellow birch	29,800	18,550
Aspen - gray birch - pin cherry	400	3,740
White pine - hemlock	43,100	18,380
White pine - white oak - red oak	65,500	51,240
Red oak - black oak - white oak	73,000	54,060
Chestnut oak	3,000	3,200
Scrub oak	1,200	1,580
Other	--	--
All forest types	216,000	150,750

Table 5.--Forest area by forest conditions and volume-per-acre classes

Forest condition and volume-per-acre classes	Area	Proportion of each condition	Proportion of total forest land
	Acres	Percent	Percent
Merchantable:			
Saw-timber stands 1/ (bd. ft. per acre)			
8,000 and over	2,700	15.8	0.7
6,000 to 7,999	2,400	14.0	0.6
4,000 to 5,999	4,100	24.0	1.0
2,000 to 3,999	7,900	46.2	2.0
All saw-timber stands	17,100	100.0	4.3
Pole-timber stands 2/ (cords per acre)			
10.0 and over	15,600	26.4	4.0
5.0 to 9.9	43,500	73.6	11.0
All pole-timber stands	59,100	100.0	15.0
All merchantable stands	76,200		19.3
Unmerchantable:			
Saw-timber stands less than 10 acres	11,200		2.8
Pole-timber stands less than 10 acres	48,300		12.2
Young growth stands	183,100		46.4
Aspen stands	13,000		3.3
Scrub oak stands	63,200		16.0
All unmerchantable stands	318,800		80.7
All forest land	395,000		100.0

1/ In stands 10 acres or larger each acre of which has at least 2,000 board feet (lumber tally).

2/ In stands 10 acres or larger each acre of which has at least 5 cords (400 cubic feet) but less than 2,000 board feet.

Table 6.--Volume by forest conditions and volume-per-acre classes

Forest condition and volume-per-acre classes	Saw-timber volume (lumber tally) 1/		Total volume (including bark)			
	M bd.ft.	Percent	M cu.ft.	Percent	Cords	Tons
Merchantable:						
Saw-timber stands (bd. ft. per acre)						
8,000 and over	29,700	13.7	7,740	5.1	97,900	192,900
6,000 to 7,999	15,800	7.3	5,020	3.3	63,300	124,800
4,000 to 5,999	19,700	9.1	7,130	4.7	90,200	177,800
2,000 to 3,999	23,700	11.0	10,440	7.0	132,500	261,000
All saw-timber stands	88,900	41.1	30,330	20.1	383,900	756,500
Pole-timber stands (cords per acre)						
10.0 and over	14,000	6.5	14,000	9.3	182,900	390,500
5.0 to 9.9	19,900	9.2	25,600	17.0	333,800	712,500
All pole-timber stands	33,900	15.7	39,600	26.3	516,700	1,103,000
All merchantable stands	122,800	56.8	69,930	46.4	900,600	1,859,500
All unmerchantable stands	93,200	43.2	80,820	53.6	1,077,700	2,149,800
All forest land	216,000	100.0	150,750	100.0	1,978,300	4,009,300

1/ Based on the International 1/4-inch rule which closely approximates green lumber tally.

Table 7.--Volume of merchantable stands by species groups

Merchantable class and species group	Saw-timber volume (lumber tally)		Total volume (including bark)					
	M bd. ft.	Percent	M cu. ft.	Percent	Cords 1/	Percent	Tons 2/	Percent
Saw-timber stands								
Conifers	52,400	58.9	13,110	43.2	154,300	40.2	277,200	36.6
Oaks, hickory, and hard maple	21,300	24.0	7,670	25.3	102,300	26.6	233,800	30.9
Other hardwoods	15,200	17.1	9,550	31.5	127,300	33.2	245,500	32.5
All species	88,900	100.0	30,330	100.0	383,900	100.0	756,500	100.0
Pole-timber stands								
Conifers	9,000	26.5	7,050	17.8	82,800	16.0	152,600	13.8
Oaks, hickory, and hard maple	19,500	57.4	21,860	55.2	291,400	56.4	670,600	60.8
Other hardwoods	5,400	16.1	10,690	27.0	142,500	27.6	279,800	25.4
All species	33,900	100.0	39,600	100.0	516,700	100.0	1,103,000	100.0
All merchantable stands	122,800		69,930		900,600		1,859,500	

1/ Based on 85 cubic feet per cord for conifers and 75 cubic feet per cord for hardwoods.

2/ Based on cubic feet-per-ton converting factors for the principal species.

Table 8.--Board foot volume in merchantable saw-timber stands by diameter classes and species groups

Diameter class (d.b.h.) (inches)	Conifers 1/		Oak and hickory 2/		Other hardwoods 3/		All species	
	M bd.ft.	Percent	M bd.ft.	Percent	M bd.ft.	Percent	M bd.ft.	Percent
10	7,000	13.4					7,000	7.9
12	9,400	18.0	2,900	13.7	3,700	24.6	16,000	18.0
14	7,500	14.3	2,800	13.0	3,600	23.3	13,900	15.6
16	7,000	13.3	3,200	14.8	2,400	15.8	12,600	14.2
18	4,600	8.7	2,100	9.9	3,000	19.9	9,700	10.9
20	4,300	8.3	2,800	13.2	1,200	7.6	8,300	9.3
22 & up	12,600	24.0	7,500	35.4	1,300	8.8	21,400	24.1
All classes	52,400	100.0	21,300	100.0	15,200	100.0	88,900	100.0

1/ Principally hemlock and white pine, with some pitch pine and red spruce.

2/ Principally red, white and chestnut oak with some hard maple, hickory and black, scarlet and pin oak.

3/ Principally red maple, yellow birch and white ash, with some beech, black birch, black cherry, walnut, yellow poplar, sycamore, willow, black locust, basswood and elm.

Table 9.--Cubic foot volume in merchantable pole-timber stands by diameter classes and species groups

Diameter class (d.b.h.)	Conifers 1/			Oaks, hickory, and hard maple 2/			Other hardwoods 3/			All species		
Inches	M cu.ft.	Percent	Tons	M cu.ft.	Percent	Tons	M cu.ft.	Percent	Tons	M cu.ft.	Percent	Tons
6	2,450	34.8	53,100	6,010	27.5	184,400	4,400	41.2	115,300	12,860	32.5	352,800
8	2,450	34.7	52,900	5,930	27.1	181,800	2,880	26.9	75,300	11,260	28.4	310,000
10	720	10.2	15,600	4,590	21.0	140,800	1,980	18.5	51,700	7,290	18.4	208,100
12	750	10.6	16,200	2,840	13.0	87,200	760	7.1	19,900	4,350	11.0	123,300
14 & up	680	9.7	14,800	2,490	11.4	76,400	670	6.3	17,600	3,840	9.7	108,800
All classes	7,050	100.0	152,600	21,860	100.0	670,600	10,690	100.0	279,800	39,600	100.0	1,103,000

1/ Principally white pine and hemlock with some pitch pine and red spruce.

2/ Principally red, white, and chestnut oak with some black, scarlet, and pin oak, hard maple and hickory.

3/ Principally red maple, aspen, yellow birch and black birch with some white ash, black cherry, basswood, yellow poplar, walnut, sycamere, willow, black locust, elm, red birch, black gum, beech, dogwood, and gray birch.

Table 1.--Land use

Land use	Area	Proportion of class	Proportion of gross area
	Acres	Percent	Percent
Forest 1/			
Tracts less than 10 acres	2,500	1.4	0.9
Tracts 10 up to 50 acres	9,700	5.0	3.3
Tracts 50 acres and over	180,200	93.6	61.4
All forest land	192,400	100.0	65.6
Nonforest			
Cropland 2/	39,300	38.9	13.4
Mine waste 1/	7,700	7.6	2.6
Water 2/	2,400	2.4	0.8
Other	51,600	51.1	17.6
All nonforest land	101,000	100.0	34.4
Gross area	293,400	100.0	100.0

1/ Based on aerial photographs taken in 1938 - 1939.

2/ Bureau of the Census, 1940.

Table 2.--Forest area by minor civil divisions

Civil division 1/	Gross area	Nonforest area	Forest area	Proportion gross area in forest	Proportion of county forest land
	Acres	Acres	Acres	Percent	Percent
Abington t.	3,100	1,800	1,300	42.9	0.7
Archbald b.	10,800	1,300	9,500	88.0	4.9
Benton t.	14,700	8,700	6,000	40.5	3.1
Carbondale t., Carbondale b., Mayfield b., Jermyn b.	13,100	3,300	9,800	74.5	5.1
Clifton t.	11,900	900	11,000	92.3	5.7
Covington t.	15,200	3,500	11,700	77.0	6.1
Dunmore b.	5,400	1,800	3,600	66.0	1.9
Fell t., Vandling b.	10,600	3,500	7,100	67.3	3.7
Glenburn t.	2,800	1,500	1,300	45.1	0.7
Greenfield t.	13,300	8,700	4,600	34.6	2.4
Jefferson t.	21,500	4,300	17,200	80.2	8.9
Lackawanna t.	3,400	500	2,900	85.7	1.5
LaPlume t., Dalton b.	3,600	2,700	900	25.7	0.5
Lehigh t.	13,700	900	12,800	93.7	6.7
Madison t., Moscow b.	12,700	4,800	7,900	62.0	4.1
Moosic b.	3,900	700	3,200	81.4	1.7
Newton t.	14,400	8,000	6,400	44.3	3.3
North Abington t.	6,000	3,400	2,600	43.9	1.4
Olyphant b.	3,600	900	2,700	75.3	1.4
Ransom t., Old Forge b.	14,300	5,300	9,000	62.7	4.7
Roaring Brook t., Elmhurst b.	15,800	2,100	13,700	86.7	7.1
Scott t., Blakely b., Dickson City b.	22,600	11,200	11,400	50.6	5.9
Scranton c.	12,500	8,400	4,100	32.7	2.1
South Abington t., Clarks Green b., Clarks Summit b.	6,800	4,100	2,700	39.4	1.4
Spring Brook t.	23,500	2,900	20,600	87.8	10.7
Taylor b.	3,500	1,900	1,600	45.3	0.8
Throop b.	3,200	700	2,500	78.3	1.3
West Abington t.	3,500	2,300	1,200	34.6	0.6
Winton b.	4,000	900	3,100	78.2	1.6
All civil divisions	293,400	101,000	192,400	65.6	100.0

1/ Abbreviations: t. - township, b. - borough.

Table 12.--Forest area by forest types and conditions

Forest type	Saw-timber stands		Pole-timber stands		Unmerchantable stands		All stands	
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
Northern hardwoods	8,200	81.1	26,300	69.2	68,900	47.6	103,400	53.7
Aspen - gray birch - pin cherry	--	--	--	--	12,200	8.5	12,200	6.3
White pine - hemlock	200	2.0	800	2.1	1,500	1.0	2,500	1.3
White pine - white oak - red oak	300	3.0	1,200	3.2	1,600	1.1	3,100	1.6
White oak - red oak - black oak	1,400	13.9	9,500	25.0	37,900	26.3	48,800	25.4
Chestnut oak	--	--	200	0.5	1,100	0.8	1,300	0.7
Scrub oak	--	--	--	--	21,000	14.6	21,000	10.9
Other	--	--	--	--	100	0.1	100	0.1
All types	10,100	100.0	38,000	100.0	144,300	100.0	192,400	100.0

Table 4.--Volume by Forest Types

Forest type	Saw-log volume	Total volume
	M bd.ft.	M cu.ft.
Sugar maple - beech - yellow birch	71,400	46,230
Aspen - gray birch - pin cherry	300	3,420
White pine - hemlock	1,500	1,070
White pine - white oak - red oak	2,000	1,600
Red oak - black oak - white oak	18,500	13,830
Chestnut oak	200	250
Scrub oak	300	250
Other	--	40
All forest types	94,200	66,690

Table 5.--Forest area by forest conditions and volume-per-acre classes

Forest condition and volume-per-acre classes	Area	Proportion of each condition	Proportion of total forest land
	Acres	Percent	Percent
Merchantable:			
Saw-timber stands 1/ (bd. ft. per acre)			
8,000 and over	1,100	10.9	0.6
6,000 to 7,999	1,300	12.9	0.7
4,000 to 5,999	2,900	28.7	1.5
2,000 to 3,999	4,800	47.5	2.5
All saw-timber stands	10,100	100.0	5.3
Pole-timber stands 2/ (cords per acre)			
10.0 and over	11,300	29.7	5.9
5.0 to 9.9	26,700	70.3	13.9
All pole-timber stands	38,000	100.0	19.8
All merchantable stands	48,100		25.1
Unmerchantable:			
Saw-timber stands less than 10 acres	3,200		1.7
Pole-timber stands less than 10 acres	13,000		6.7
Young growth stands	94,900		49.2
Aspen stands	12,200		6.3
Scrub oak stands	21,000		1.1
All unmerchantable stands	144,300		74.9
All forest land	192,400		100.0

1/ In stands 10 acres or larger each acre of which has at least 2,000 board feet (lumber tally).

2/ In stands 10 acres or larger each acre of which has at least 5 cords (400 cubic feet) but less than 2,000 board feet.

Table 6.--Volume by forest conditions and volume-per-acre classes

Forest condition and volume-per-acre classes	Saw-timber volume (lumber tally) 1/		Total volume (including bark)			
	M bd.ft.	Percent	M cu.ft.	Percent	Cords	Tons
Merchantables:						
Saw-timber stands (bd. ft. per acre)						
8,000 and over	10,200	11.3	2,640	4.0	34,300	69,000
6,000 to 7,999	7,900	8.7	2,280	3.4	29,600	59,600
4,000 to 5,999	12,600	13.9	4,510	6.8	58,900	118,400
2,000 to 3,999	11,900	13.2	5,640	8.4	73,400	147,500
All saw-timber stands	42,600	47.1	15,070	22.6	196,200	394,500
Pole-timber stands (cords per acre)						
10.0 and over	9,200	10.2	10,120	15.2	133,500	270,600
5.0 to 9.9	12,500	13.8	16,590	24.8	218,800	443,400
All pole-timber stands	21,700	24.0	26,710	40.0	352,300	714,000
All merchantable stands	64,300	71.1	41,780	62.6	548,500	1,108,500
All unmerchantable stands	29,900	28.9	24,910	37.4	332,100	660,100
All forest land	94,200	100.0	66,690	100.0	880,600	1,768,600

1/ Based on the International 1/4-inch rule which closely approximates green lumber tally.

Table 7.--Volume in merchantable stands by species groups

Merchantable class and species group	Saw-timber volume: (lumber tally)		Total volume (including bark)					
	M bd.ft.	Percent	M cu.ft.	Percent	Cords 1/	Percent	Tons 2/	Percent
Saw-timber stands								
Conifers	10,900	25.6	3,040	20.2	35,800	18.2	69,200	17.5
Oaks, hickory and hard maple	10,800	25.4	4,310	28.6	57,500	29.3	126,800	32.1
Other hardwoods	20,900	49.0	7,720	51.2	102,900	52.5	198,500	50.4
All species	42,600	100.0	15,070	100.0	196,200	100.0	394,500	100.0
Pole-timber stands								
Conifers	4,000	18.7	2,460	9.2	29,000	8.2	53,400	7.5
Oaks, hickory and hard maple	8,400	38.4	8,490	31.8	113,200	32.1	253,400	35.5
Other hardwoods	9,300	42.9	15,760	59.0	210,100	59.7	407,200	57.0
All species	21,700	100.0	26,710	100.0	352,300	100.0	714,000	100.0
All merchantable stands	64,300		41,780		548,500		1,108,500	

1/ Based on 85 cubic feet per cord for conifers and 75 cubic feet per cord for hardwoods.

2/ Based on cubic feet-per-ton converting factors for the principal species.

Table 8.--Board foot volume in merchantable saw-timber stands by diameter classes and species groups

Diameter class (d.b.h.) (inches)	Conifers 1/		Oaks hard maple hickory 2/		Other hardwoods 3/		All species	
	M bd.ft.	Percent	M bd.ft.	Percent	M bd.ft.	Percent	M bd.ft.	Percent
10	1,300	11.8					1,300	3.0
12	1,800	16.7	1,900	17.8	3,600	17.4	7,300	17.2
14	1,700	15.7	1,800	16.8	4,100	19.5	7,600	17.9
16	800	6.9	1,200	10.9	3,100	14.9	5,100	12.0
18	400	3.9	1,200	10.9	4,000	19.0	5,600	13.1
20	1,500	13.7	1,300	11.9	2,800	13.3	5,600	13.1
22 & up	3,400	31.3	3,400	31.7	3,300	15.9	10,100	23.7
All classes	10,900	100.0	10,800	100.0	20,900	100.0	42,600	100.0

1/ Principally hemlock and white pine, with some pitch pine and red spruce.

2/ Principally hard maple, red and white oak, with some hickory and chestnut, black, scarlet and pin oak.

3/ Principally beech, red maple, white ash and yellow birch, with some basswood, black cherry, walnut, sycamore, willow, black locust, elm and yellow poplar.

Table 9.--Cubic foot volume in merchantable pole-timber stands by diameter classes and species groups

Diameter class (d.b.h.)	Conifers 1/			Oaks, hickory, and hard maple 2/			Other hardwoods 3/			All species		
Inches	M cu.ft.	Percent	Tons	M cu.ft.	Percent	Tons	M cu.ft.	Percent	Tons	M cu.ft.	Percent	Tons
6	750	30.3	16,200	2,330	27.5	69,700	5,420	34.4	140,100	8,500	31.9	226,000
8	710	28.9	15,400	2,160	25.4	64,400	4,730	30.0	122,200	7,600	28.4	202,000
10	480	19.7	10,500	1,830	21.6	54,700	3,070	19.5	79,400	5,380	20.2	144,600
12	300	12.3	6,600	930	10.9	27,600	1,390	8.8	35,800	2,620	9.8	70,000
14 & up	220	8.8	4,700	1,240	14.6	37,000	1,150	7.3	29,700	2,610	9.7	71,400
All classes	2,460	100.0	53,400	8,490	100.0	253,400	15,760	100.0	407,200	26,710	100.0	714,000

1/ Principally hemlock and white pine with some pitch pine and red spruce.

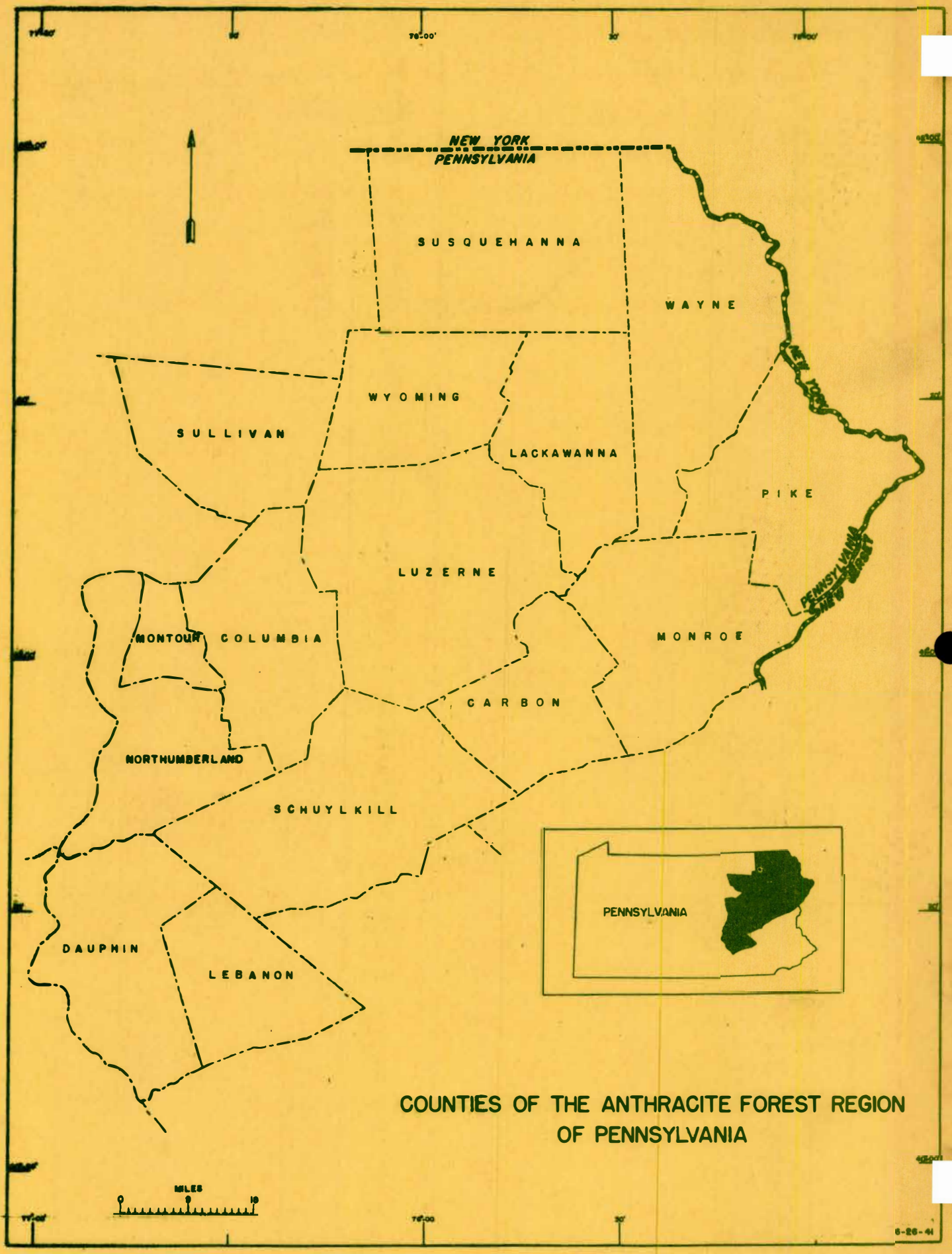
2/ Principally hard maple, white oak, and red oak with some black oak, scarlet oak, and hickory.

3/ Principally red maple, beech, yellow birch and black birch, with some black cherry, aspen, white ash, basswood, elm, red birch, gray birch, ironwood, dogwood, sycamore, walnut, willow, black gum and black locust.

Anthracite Survey Papers

No.	Title
1	Survey of Forest Employment Possibilities in the Anthracite Region of Pennsylvania*
2	Intensified Protection of Wyoming Valley Forests Against Fire Through Use of Community Labor*
3	Tax Delinquency of Forest Lands in the Anthracite Region of Pennsylvania**
4	Volume Tables for Commercial Timber in the Anthracite Region of Pennsylvania*
5	The Forests of Luzerne County, Pennsylvania, in Relation to Employment and Welfare
6	The Population and Employment Outlook for the Anthracite Region of Pennsylvania
7	The Forest Situation in Pike and Monroe Counties
8	The Forest Situation in Dauphin and Lebanon Counties
9	The Forest Situation in Schuylkill and Carbon Counties
10	The Forest Situation in Wyoming and Sullivan Counties
11	The Forest Situation in Northumberland, Columbia, and Montour Counties
12	The Forest Situation in Luzerne and Lackawanna Counties
13	The Forest Situation in Wayne and Susquehanna Counties

* Supply limited
** Out of print



COUNTIES OF THE ANTHRACITE FOREST REGION
OF PENNSYLVANIA